

# Susquehanna River Anadromous Fish Restoration Cooperative



## Summary of 2022 PFBC Activities



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Anadromous Fish Restoration Unit  
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**Mission:** To protect, conserve, and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities

# Outline

- Hatchery Operations
- Biomonitoring
- Plans for 2023



# Van Dyke Hatchery - Overview

- Seasonal facility since 1976 (April–June)
- Research culture & tagging techniques
- Intensive Fish Culture
- Staff: (1) Fisheries Biologist, (5) Wage



Photo: CBP



# 2022 Hatchery Operations - Eggs

- **Potomac River – USFWS Strip Spawn**

- Collections 4/10 - 5/5, 16 shipments (9.32-million eggs), 23.3% live
- Contract collection thru 2024

- **Delaware River – PFBC Strip Spawn**

- Collections 5/16 - 5/24, 3 shipments (807K eggs), 3.2% live



- **Susquehanna River**

- Tank spawning discontinued
- No plans to restart



## 2022 American Shad Egg Shipment Summary

Shipment	Egg Source	Date Spawned	Date Receive	Egg Vol. (L)	Eggs (#)	Viable Eggs (#)	% Viable	Initial Mean # Eggs/L	Shipment Disposition
1	Potomac	4/10/22	4/11/22	3.9	201,516	610	0.3%	51,671	<i>Dumped</i>
2	Potomac	4/12/22	4/13/22	3	182,398	1,673	0.9%	60,799	<i>Dumped</i>
3	Potomac	4/13/22	4/14/22	9	333,098	94,536	28.4%	37,011	<b>Hatched</b>
4	Potomac	4/14/22	4/15/22	14.8	525,331	283,459	54.0%	35,495	<b>Hatched</b>
5	Potomac	4/17/22	4/18/22	3.9	139,894	45,762	32.7%	35,870	<b>Hatched</b>
6	Potomac	4/19/22	4/20/22	17.4	764,452	396,025	51.8%	43,934	<b>Hatched</b>
7	Potomac	4/20/22	4/21/22	16.7	586,554	208,029	35.5%	35,123	<b>Hatched</b>
8	Potomac	4/21/22	4/22/22	26.5	1,097,100	193,917	17.7%	41,400	<b>Hatched</b>
9	Potomac	4/24/22	4/25/22	10.85	427,103	220,855	51.7%	39,364	<b>Hatched</b>
10	Potomac	4/26/22	4/27/22	7	425,596	64,887	15.2%	60,799	<b>Hatched</b>
11	Potomac	4/27/22	4/28/22	21.9	1,045,099	228,860	21.9%	54,604	<b>Hatched</b>
12	Potomac	4/28/22	4/29/22	28.1	1,195,812	280,781	23.5%	37,011	<b>Hatched</b>
13	Potomac	5/1/22	5/2/22	7.2	272,050	105,653	38.8%	37,785	<b>Hatched</b>
14	Potomac	5/2/22	5/3/22	5.7	506,576	0	0.0%	88,873	<i>Dumped</i>
15	Potomac	5/3/22	5/4/22	10.3	819,597	41,726	5.1%	79,573	<b>Hatched</b>
16	Potomac	5/5/22	5/6/22	10.8	805,265	0	0.0%	74,562	<i>Dumped</i>
17	Delaware	5/16/22	5/17/22	4.2	269,076	12,066	4.5%	64,066	<i>Dumped</i>
18	Delaware	5/22/22	5/23/22	2.7	304,539	0	0.0%	112,792	<i>Dumped</i>
19	Delaware	5/24/22	5/25/22	2.4	233,758	3,777	1.6%	97,399	<i>Dumped</i>

### Summary of All Egg Shipments

River	Shipments	Egg Vol (L)	Eggs (#)	Viable Eggs (#)	% Viable
Potomac	16	197.1	9,327,441	2,166,773	23.2%
Delaware	3	9.3	807,372	15,844	3.2%

### Summary of Egg Shipments Used for Fry Culture

River	Shipments	Egg Vol (L)	Eggs (#)	Viable Eggs (#)	% Viable
Potomac	12	173.7	7,631,686	2,164,489	28.4%
Delaware	0	0	0	0	0



# 2022 Hatchery Operations - Stocking

## 2022 American Shad Fry Production & Stocking Summary

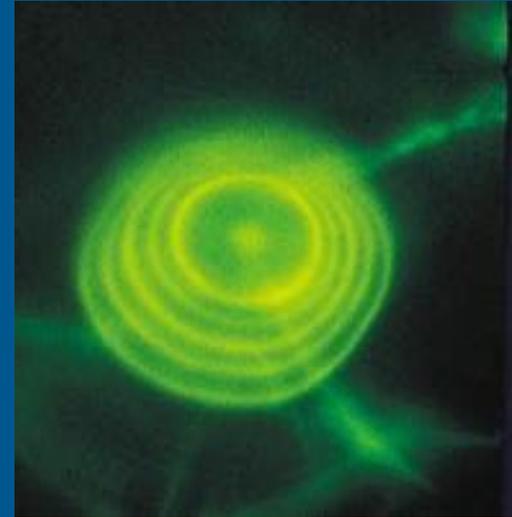
Stocking Locations	Age (days)	# Fry
Raystown Branch Juniata River, Corbin's Island, PA	22-27	722,527
Juniata River, Thompsettown, PA	20	146,860
<i>Juniata River Subtotal</i>		<i>869,387</i>
West Branch Susquehanna River, Avis, PA	21-27	305,911
Susquehanna River, Endicott, NY	26-30	322,755
<i>Susquehanna River Subtotal</i>		<i>628,666</i>
<b>Susquehanna Basin Total</b>		<b>1,498,053</b>

- No out of the ordinary mortality, Hatchery Survival 69.2%



# 2022 Hatchery Operations - OTC

- **OTC Tag Retention, 100%**
  - 5 tanks w/ OTC days 3,9,12,15 (Juniata River)
  - 3 tanks w/ OTC days 15,18 (Susquehanna River)
  - 4 tanks w/ OTC days 18 (W.Br. Susquehanna River)



# 2022 Biomonitoring - Adults

## 2022 Adult American Shad Collections & Summary of Otolith Analysis for OTC Marks

Sample Type	Location	n	% Wild	% Hatchery
Sacrifice (1 of every 50th caught)	East Fish Lift	45	68.9%	31.1%
Sacrifice (1 of every 50th caught)	West Fish Lift	47	53.2%	46.8%
Holding Mortality	East Fish Lift	23	73.9%	26.1%
Holding Mortality	West Fish Lift	6	66.7%	33.3%
Transport Mortality		5	80.0%	20.0%
Transport Skid Mortality		37	54.1%	45.9%
Whooshh Tube		69	73.9%	26.1%
Whooshh Control		22	45.5%	54.5%
	<b>Total</b>	<b>254</b>	<b>63.8%</b>	<b>36.2%</b>

- 39.1% of sacrificed shad were hatchery origin

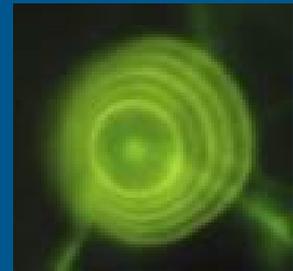


# 2022 Biomonitoring - Adults

## Summary of OTC Marks Detected in Otoliths of Adult American Shad Collected at Conowingo Dam, 2022

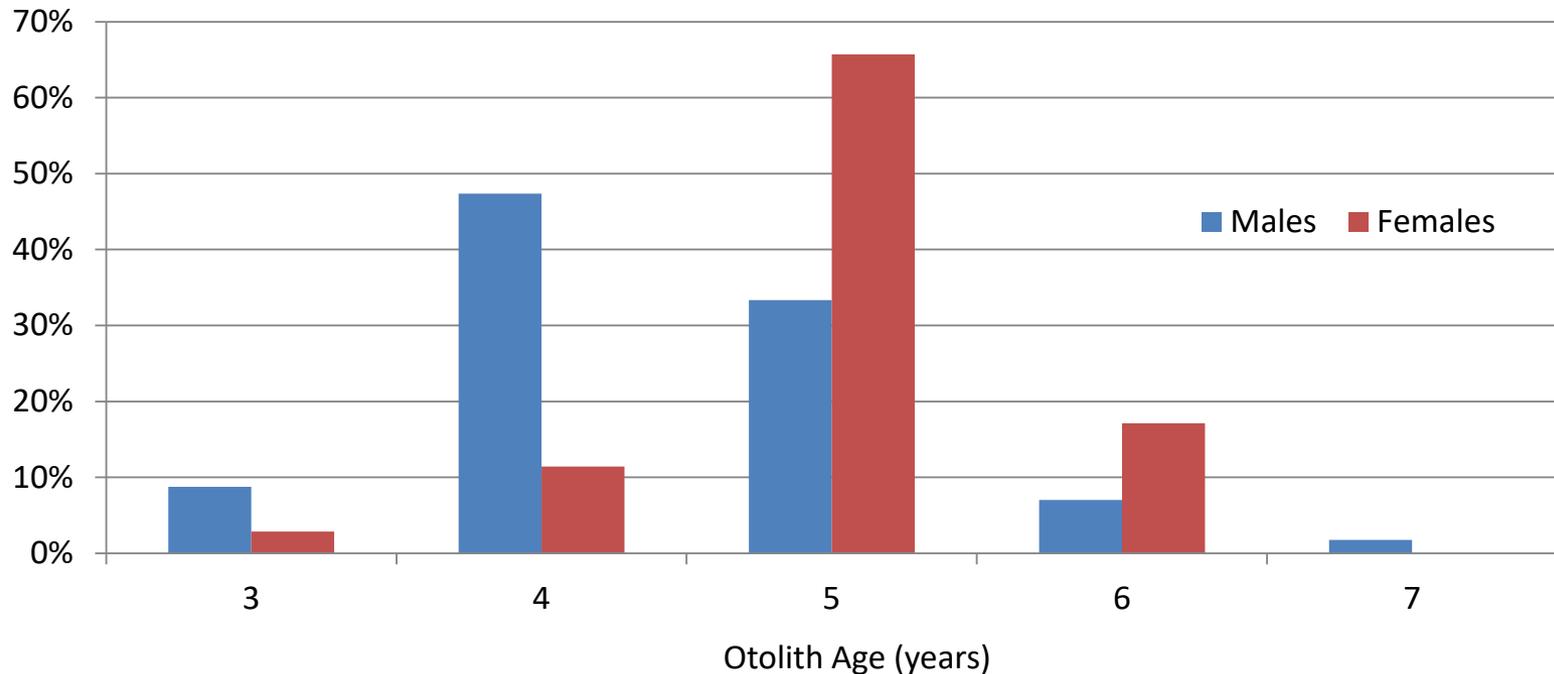
OTC Mark Sequence (days)	Stocking Location	#
9	Susquehanna River	1
3,6	Raystown Branch Juniata River	9
<b>3,9 *</b>	<b>Raystown Branch Juniata River (2019 cohort)</b>	<b>13</b>
3,18	West Branch Susquehanna River	2
<b>3,4,9 *</b>	<b>Juniata River Raystown Branch (2019 cohort)</b>	<b>4</b>
3,6,9	Juniata River	49
<b>3,6,18 *</b>	<b>Raystown Branch Juniata River (2018 cohort)</b>	<b>3</b>
<b>3,9,18 *</b>	<b>West Branch Susquehanna River (2018 cohort)</b>	<b>2</b>
3,6,9,12	Schuylkill River	1
3,6,9,15	North Branch Susquehanna River	1
3,6,9,12,15	West Branch Susquehanna River	5
<b>3,6,9,12,15,18 *</b>	<b>North Branch Susquehanna River (2018 cohort)</b>	<b>2</b>

\* Notes unique OTC mark sequences for known age validations.



# 2022 Biomonitoring - Adults

American Shad Age Distribution, Conowingo Dam, 2022

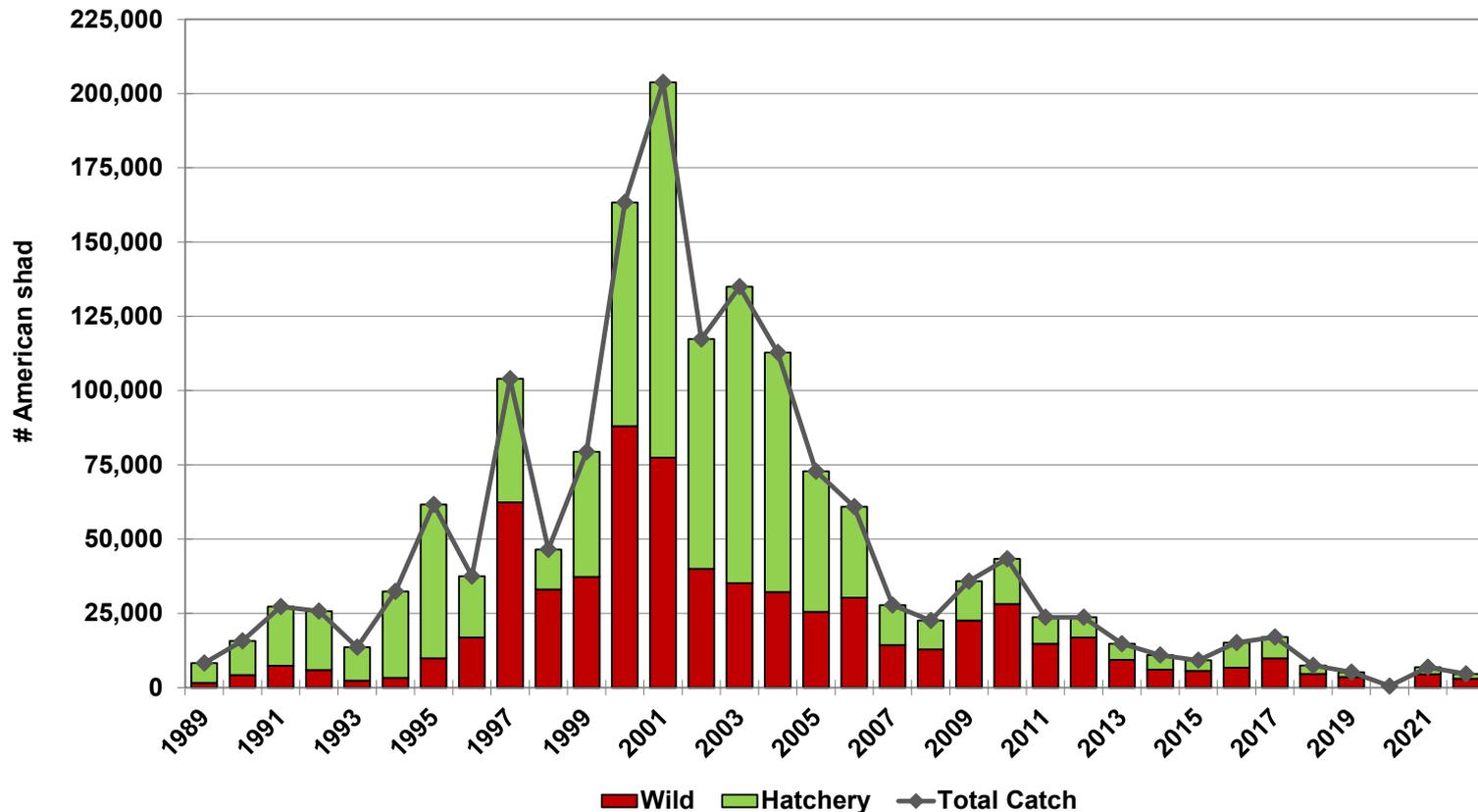


- 35% Repeat Spawners



# 2022 Biomonitoring - Adults

Annual American Shad Catch at Conowingo Dam Fish Lifts,  
Partitioned by Origin Based on OTC Hatchery Marks, 1989-2022

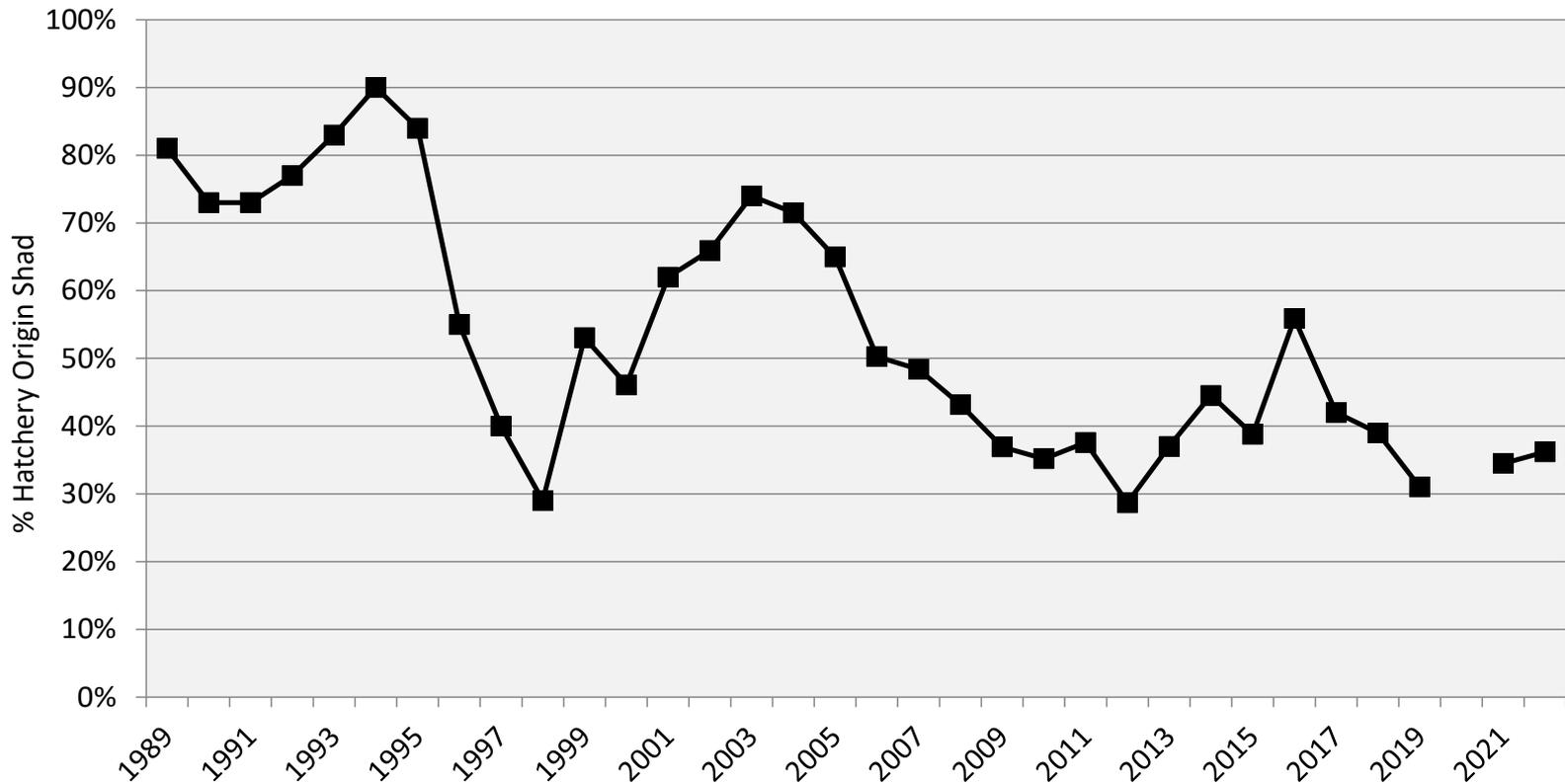


- 57% of adult shad captured at Conowingo have been hatchery origin fish (long term average, 1989-2022)



# 2022 Biomonitoring - Adults

Annual Proportion of Hatchery Origin American shad, Conowingo Dam, 1989-2022



# 2022 Biomonitoring – Adults

## 2022 Adult Alewife Collections, Conowingo Dam

<b>Sample Type</b>	<b>Location</b>	<b>#</b>
Sacrifice (first 50 + 1 of every 25th caught)	East Fish Lift	1
Sacrifice (first 50 + 1 of every 25th caught)	West Fish Lift	78
Holding Mortality	West Fish Lift	14
Lift Mort	West Fish Lift	3
<b>Total</b>		<b>96</b>

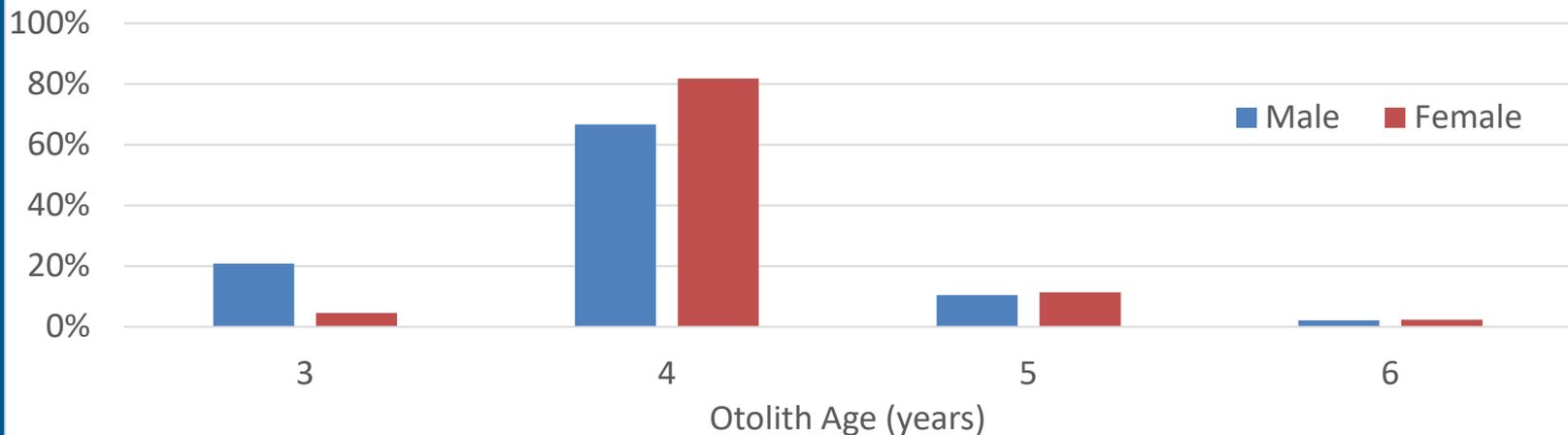
## 2022 Adult Blueback Herring Collections, Conowingo Dam

<b>Sample Type</b>	<b>Location</b>	<b>#</b>
Sacrifice (first 50 + 1 of every 25th caught)	East Fish Lift	51
Sacrifice (first 50 + 1 of every 25th caught)	West Fish Lift	56
Transport Skid Mortality		2
<b>Total</b>		<b>109</b>

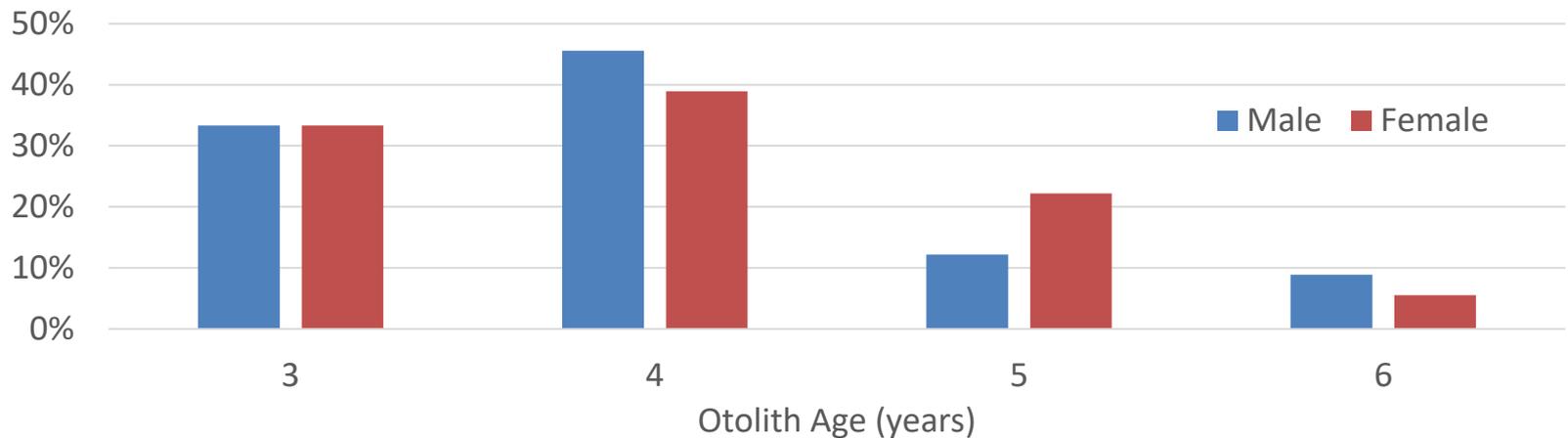


# 2022 Biomonitoring – Adults

## Alewife Age Distribution, Conowingo Dam 2022



## Blueback Herring Age Distribution, Conowingo Dam 2022



# 2022 Biomonitoring – Juveniles

- **Haul Seine Survey - PFBC:**

- timing, abundance, hatchery contribution
- 1 event, Juniata R @ Mapleton, 9/27
  - YOY AMS observed, none captured



- **Incidental AMS Captures - PFBC FM:**

- (8) catch & release, Juniata R @ Mapleton, 9/19
- (2) collected, Susquehanna River @ Wrightsville, 9/19
- (2) collected, Juniata R @ Mapleton, 10/17



# 2022 Biomonitoring – Juveniles

- Conowingo Strainer Screen Samples:
  - 4 AMS & 2 Alewife collected 11/4 - 11/19
- **PBAPS Impingement:**
  - 26 AMS & 33 Alewife collected 10/14 - 11/21
- Observations – Normandeau staff:
  - Large school at dusk, Susquehanna @ TMI



# 2022 Biomonitoring – Juveniles

- Otolith Analysis for OTC Marks
  - **Juniata recaps (2):**
    - 100% Hatchery (Juniata Stockings)
  - **Susquehanna recaps (2):**
    - 50% Hatchery (Juniata stockings)
  - **To Be Processed:**
    - Conowingo Strainer (3 to 4)
    - PBAPS Impingement (26)
    - Others ?



# Ongoing PFBC Activities

- Reporting obligations
  - NOAA: Semi-annual progress report thru 2022
  - ASMFC: Annual Compliance report thru 2022
- **Analyze 2022 YOY AMS for OTC marks**
- Planning to relocate hatchery operations
  - ~ \$1.2 million for infrastructure improvement
  - Likely location at PFBC Huntsdale SFH
  - 3 to 5 year process



# Ongoing PFBC Activities (cont)

- Planning for 2023
  - Hiring & training new staff
  - Fry Production 2023
    - Van Dyke w/ possible trials at Huntsdale SFH?
    - Potomac River eggs (Delaware, too)
    - Fry Stockings in Juniata, Susq. (Lehigh & Schuylkill, too)
    - OTC mark all fry
  - Shad Biomonitoring 2023
    - Adults: Conowingo T&T catch
    - Juveniles: haul sein, strainer screens, other



Questions?